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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/573,678 | 11/20/2006 | Vincent Francis Fusco | 36290-396 (222223) | 5079 |
| 7590 Gregory J Lavorgna Drinker Biddle and Reath One Logan Square 18th and Cherry Streets Philadelphia, PA 19103 | | | EXAMINER CORRIELUS, JEAN B | |
| | | | ART UNIT 2611 | PAPER NUMBER |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/573,678

Applicant(s)

FUSCO ET AL.

Examiner

Jean B. Corielus

Art Unit

2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 March 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 March 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-8508)
- Paper No(s)/Mail Date 3/23/06
- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Specification

1. The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

- (a) TITLE OF THE INVENTION.
 - (b) CROSS-REFERENCE TO RELATED APPLICATIONS.
 - (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
 - (d) THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT.
 - (e) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC.
 - (f) BACKGROUND OF THE INVENTION.
 - (1) Field of the Invention.
 - (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
 - (g) BRIEF SUMMARY OF THE INVENTION.
 - (h) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
 - (i) DETAILED DESCRIPTION OF THE INVENTION.
 - (j) CLAIM OR CLAIMS (commencing on a separate sheet).
 - (k) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
 - (l) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).
2. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The

abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

Drawings

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the further PLL, as recited in claim 7; the **"a feedback heterodyne mixer mixes an input receiving the main output signal and the input receiving the reference input signal"**, as recited in claim 10, the combination of the first divider, second divider and third divider, as recited in claim 11, must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

In addition, the drawings are further objected to for the following reasons: Please use descriptive language to identify each drawing component and Relocate the reference numbers to the outside of each drawing component with proper signal lead to point to the corresponding component.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and

where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 1, the word "means" is preceded by the word(s) " phase detecting" in an attempt to use a "means" clause to recite a claim element as a means for performing a specified function. However, since no function is specified by the word(s) preceding "means," it is impossible to determine the equivalents of the element, as required by 35 U.S.C. 112, sixth paragraph. See *Ex parte Klumb*, 159 USPQ 694 (Bd. App. 1967).

Claim 3, "the upconverted mixing product" lacks of proper antecedent basis.

As per claim 8, the limitation "an input" (each occurrence) is vague and indefinite as there is an unclear antecedent in claim 7.

Note that any claim whose base claim is objected is likewise objected.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1-3, 6 and 15 are rejected under 35 U.S.C. 102(e) as being anticipated by Jun US Patent No. Publication No. 20030161414.

As per claim 1, Jun teaches a method and apparatus fig. 10 comprising an input receiving a reference input signal, note paragraph 0079 that teaches that the phase detector is configured to receive a reference signal; and a phase locked loop (PLL) circuit note fig. 10 comprising an oscillator 710 having a main output signal note output of 710, an input receiving a PLL input signal i.e. the reference signal see paragraph 0079, an input receiving a feedback signal from the oscillator note fig.10 and a phase detecting means 711, wherein the phase detection means 711 detects any phase difference between the PLL input signal i.e. the reference signal and the feedback signal i.e. out of mixer 709 and provides a phase control signal to the oscillator (710 and 708).

As claim 2, Jun further teaches a mixer 709 corresponding to the claimed "first heterodyne mixer" mixes the main input signal output of A/D 700 and the main output signal output of 710 to provide the feedback signal and the PLL input signal is the reference input signal see paragraph 0079.

As per claim 3, because there is no structural difference between the claimed invention and the prior art, it is the examiner position that the mixer of Jun is capable of generating a upconverter signal.

As per claim 6, note that the phase detecting means is a digital phase detector because the circuit includes all digital circuit such as A/D, NCO and so forth (see fig. 10).

As per claim 15, see claim 1. Note that the frequency of feedback signal has to be proportional with a frequency of the pll input (i.e. reference signal) because the PLL use the reference signal (input of the PLL) to lock to the feedback signal.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jun US Patent No. Publication No. 20030161414 in view of Tausworthe et al US patent no. 4,148,031.

As applied to claim 1 above, Jun teaches every feature of the claimed invention but does not teach the further limitations of an input heterodyne mixer mixes the main input signal and the reference input signal, the PLL input signal is the down-converted mixing product of the input heterodyne mixer and the feedback signal is the main output signal, the main input signal and the main output signal having substantially equal frequencies. Tausworthe et al teaches fig. 5 a mixer 59 (input heterodyne mixer) mixes the main input signal note output of multiplier and the reference input signal note output of LO, the PLL input signal is the down-converted mixing product of the input heterodyne mixer and the feedback signal is the main output signal see fig. 5, the main input signal and the main output signal having substantially equal frequencies note that in order for the comparator of mixer 59 to perform comparison/mixing on the signal, both signal have to have the same frequency. Hence given that fact, it would have been obvious to one skill in the art to incorporate such a teaching in Jun doing so would have enhanced Jun system by allowing it to reduce processing load of the system.

10. Claims 14 and 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jun US Patent No. Publication No. 20030161414 .

As per claim 14, as applied to claim 1 above, Jun teaches every feature of the claimed invention but does not explicitly teach the further limitation of using a VCO as the oscillator. However it is well know in the field of PLL to use either NCO, VCO to generate oscillation signal. One skill in the art would have been motivated to use a VCO in order to be able to use analog devices.

With respect to claim 4, examiner notes that it is well known in the art to scale the frequency of the input signal to match the frequency of the feedback. Given that, it would have been obvious to one skill in the art to scale the reference input signal to match the feedback signal because it would enable operation phase detector. In order words, the phase detector will perform better if the signals being compared have the same frequency.

As per claim 5, it would have been obvious to one skill in the art to scale the feedback signal and the motivation to do so would have been the same as provided above with respect to claim 4.

11. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jun US Patent No. Publication No. 20030161414 in view of Gore et al US Patent no. 6,484,038.

As per claim 7, as applied to claim 1 above, Jun teaches every feature of the claimed invention but does not explicitly teach the further limitation the phase detection means also detects any phase difference between an input receiving the main output signal and an input receiving the reference signal thereby creating a further phase locked loop. Gore et al teaches the phase detection means (43 and 49) also detects any phase difference between an input receiving the main output signal and an input receiving the reference signal thereby creating a further phase locked loop note the multiple loops in fig. 5. Given that fact, it would have been obvious to one skill in the art to incorporate such a teaching in Jun so that signal processing be performed for both a transmit channel and a receive channel as taught by Gore et al see fig. 5.

Allowable Subject Matter

12. Claims 8-11 and 13 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Conclusion

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jean B. Corrielus whose telephone number is 571-272-3020. The examiner can normally be reached on Monday-Thursday from 9:30-3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on 571-272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jean B Corrielus/
Primary Examiner
Art Unit 2611

